

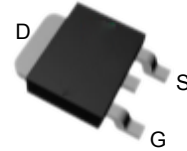
## Features

- 68V/80A,  
 $R_{DS(ON)} = 5.7m\Omega$  (typ.) @  $V_{GS}=10V$
- Reliable and Rugged
- Lead Free and Green Devices Available  
(RoHS Compliant)

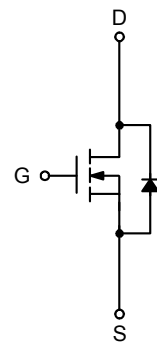
## Applications

- Synchronous Rectification.
- Power Management in Inverter Systems.

## Pin Description



Top View of TO-252-2



N-Channel MOSFET

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol                        | Parameter                              |                       | Rating     | Unit |
|-------------------------------|----------------------------------------|-----------------------|------------|------|
| Common Ratings                |                                        |                       |            |      |
| V <sub>DSS</sub>              | Drain-Source Voltage                   |                       | 68         | V    |
| V <sub>GSS</sub>              | Gate-Source Voltage                    |                       | ±25        |      |
| T <sub>J</sub>                | Maximum Junction Temperature           |                       | 150        | °C   |
| T <sub>STG</sub>              | Storage Temperature Range              |                       | -55 to 150 |      |
| I <sub>S</sub>                | Diode Continuous Forward Current       | T <sub>C</sub> =25°C  | 40         | A    |
| I <sub>D</sub>                | Continuous Drain Current               | T <sub>C</sub> =25°C  | 80         | A    |
|                               |                                        | T <sub>C</sub> =100°C | 50         |      |
| I <sub>DM</sub> <sup>a</sup>  | Pulsed Drain Current                   | T <sub>C</sub> =25°C  | 300        |      |
| P <sub>D</sub>                | Maximum Power Dissipation              | T <sub>C</sub> =25°C  | 96         | W    |
|                               |                                        | T <sub>C</sub> =100°C | 38         |      |
| R <sub>θJC</sub>              | Thermal Resistance-Junction to Case    |                       | 1.3        | °C/W |
| I <sub>D</sub>                | Continuous Drain Current               | T <sub>A</sub> =25°C  | 13         | A    |
|                               |                                        | T <sub>A</sub> =70°C  | 10         |      |
| P <sub>D</sub>                | Maximum Power Dissipation              | T <sub>A</sub> =25°C  | 2.5        | W    |
|                               |                                        | T <sub>A</sub> =70°C  | 1.6        |      |
| R <sub>θJA</sub> <sup>c</sup> | Thermal Resistance-Junction to Ambient |                       | 50         | °C/W |
| I <sub>AS</sub> <sup>b</sup>  | Avalanche Current, Single pulse        | L=0.5mH               | 30         | A    |
| E <sub>AS</sub> <sup>b</sup>  | Avalanche Energy, Single pulse         | L=0.5mH               | 225        | mJ   |

Note a : Pulse width limited by max. junction temperature.

Note b : UIS tested and pulse width limited by maximum junction temperature  $150^\circ\text{C}$  (initial temperature  $T_J = 25^\circ\text{C}$ ).

Note c : Surface Mounted on  $1\text{in}^2$  pad area,

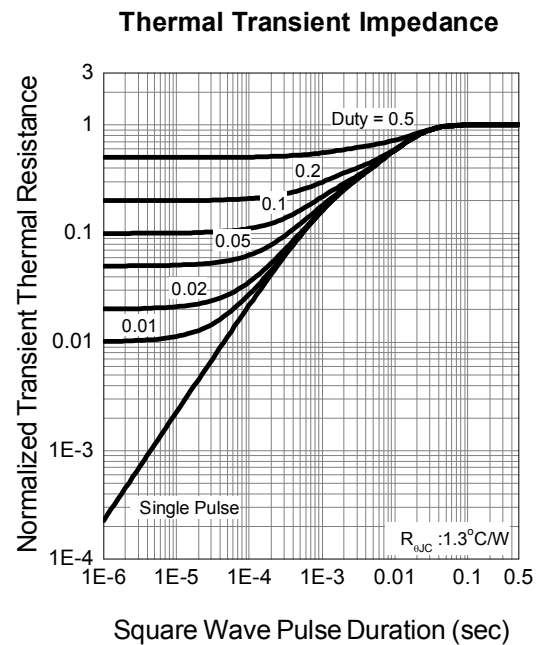
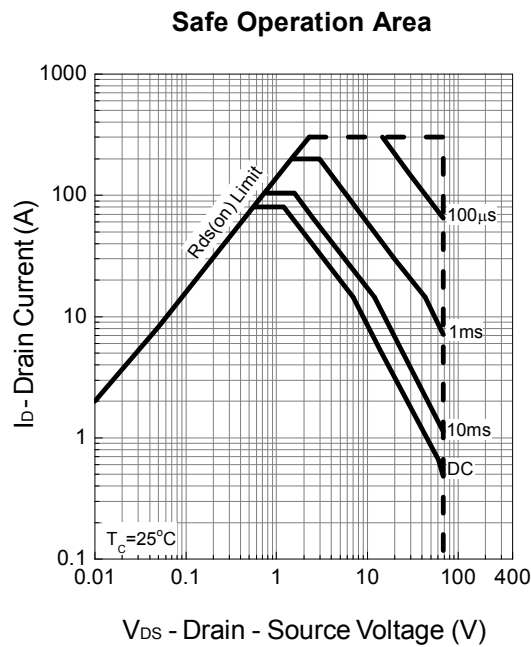
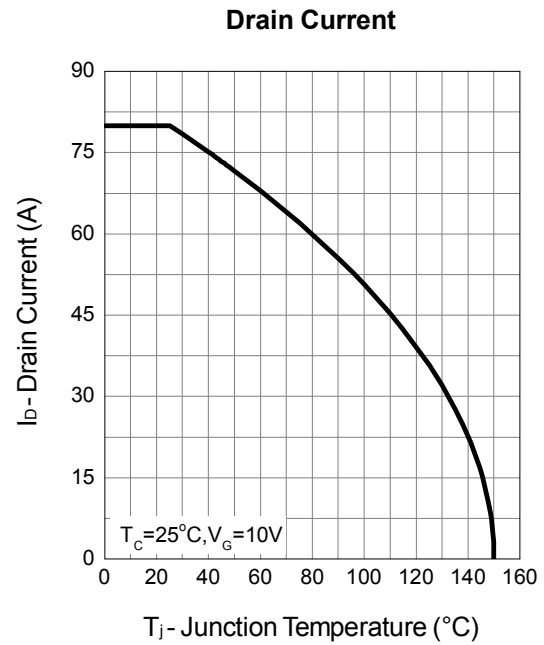
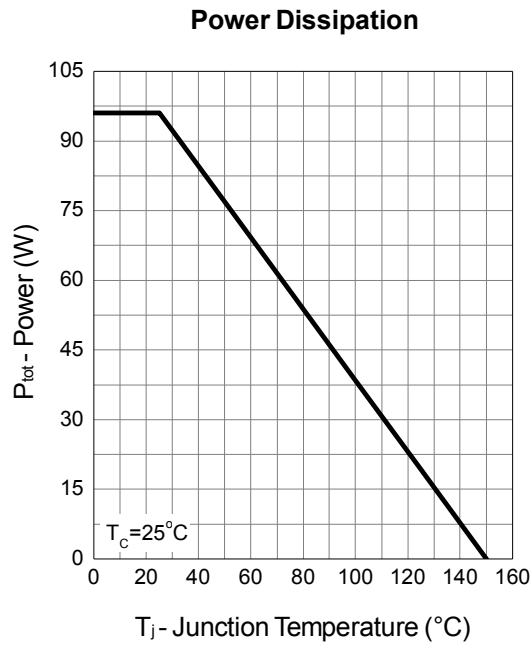
## Electrical Characteristics (T<sub>A</sub> = 25°C Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Conditions                                                                                           | Min. | Typ. | Max. | Unit |
|------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                   |                                  |                                                                                                           |      |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                                               | 68   | -    | -    | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =54V, V <sub>GS</sub> =0V                                                                 | -    | -    | 1    | μA   |
|                                          |                                  | T <sub>J</sub> =85°C                                                                                      | -    | -    | 30   |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA                                                 | 2    | 3    | 4    | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V                                                                | -    | -    | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>d</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =10V, I <sub>DS</sub> =40A                                                                | -    | 5.7  | 6.5  | mΩ   |
| Diode Characteristics                    |                                  |                                                                                                           |      |      |      |      |
| V <sub>SD</sub> <sup>d</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =20A, V <sub>GS</sub> =0V                                                                 | -    | 0.8  | 1.3  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =40A, dI <sub>SD</sub> /dt=100A/μs                                                        | -    | 30   | -    | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                           | -    | 32   | -    | nC   |
| Dynamic Characteristics <sup>e</sup>     |                                  |                                                                                                           |      |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                                          | -    | 1.1  | -    | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, Frequency=1.0MHz                                               | -    | 4000 | 5200 | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                           | -    | 340  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                           | -    | 260  | -    |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =30V, R <sub>L</sub> =30Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω | -    | 28   | 50   | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                           | -    | 20   | 36   |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                           | -    | 80   | 144  |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                           | -    | 38   | 69   |      |
| Gate Charge Characteristics <sup>e</sup> |                                  |                                                                                                           |      |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>DS</sub> =40A                                          | -    | 80   | 112  |      |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                           | -    | 27   | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                           | -    | 23   | -    |      |

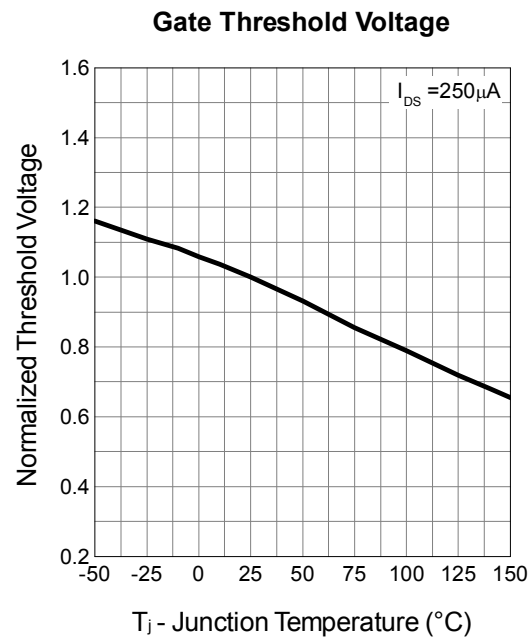
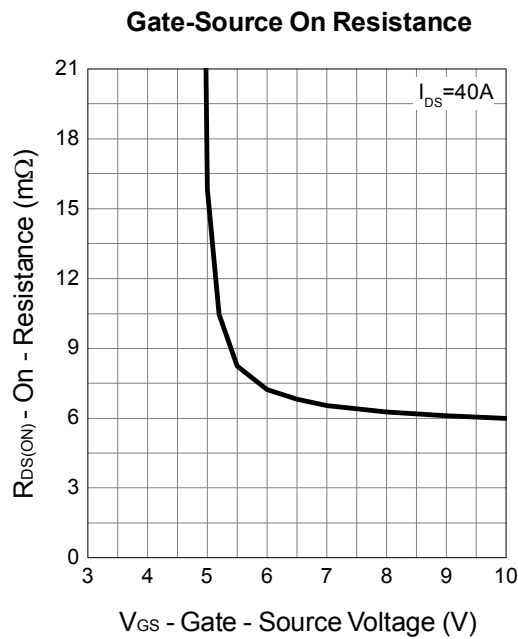
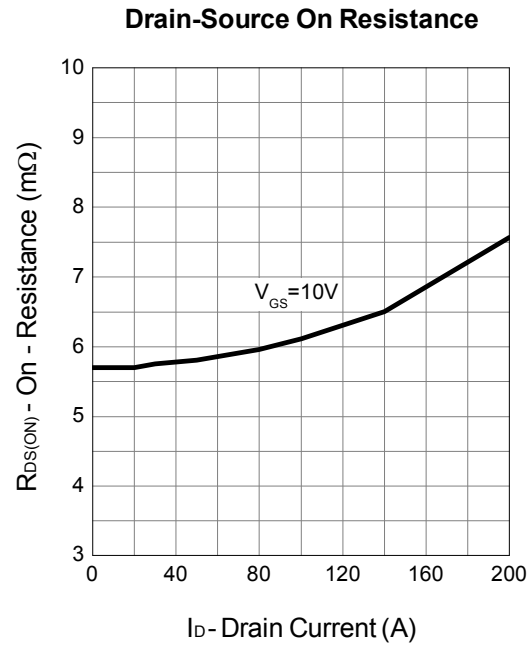
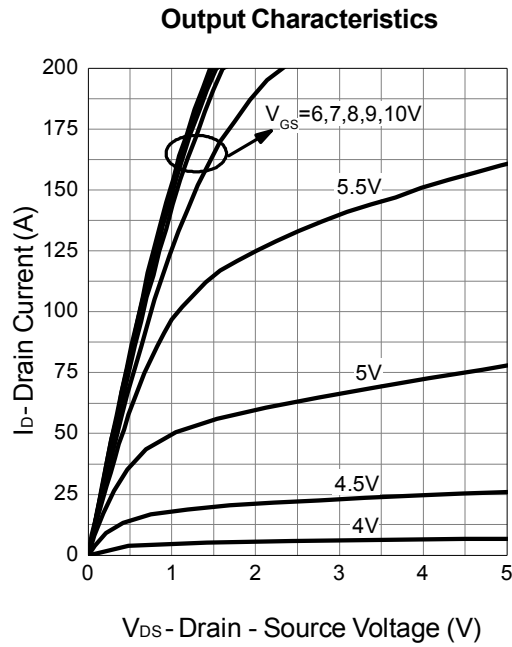
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Note e : Guaranteed by design, not subject to production testing.

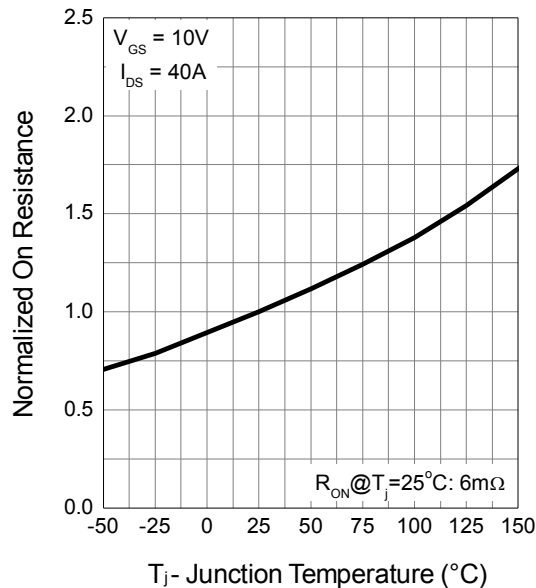
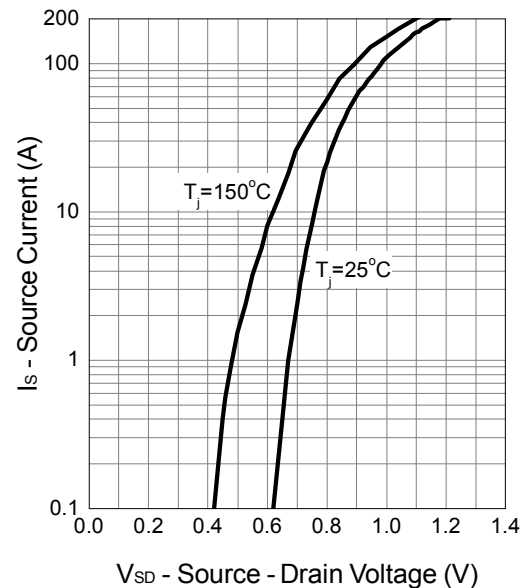
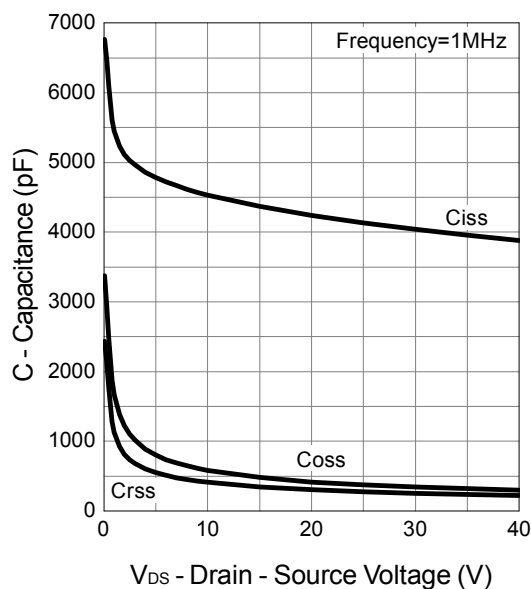
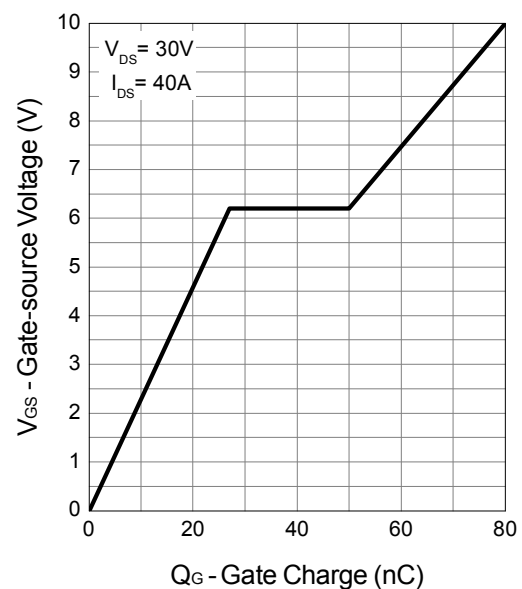
## Typical Operating Characteristics



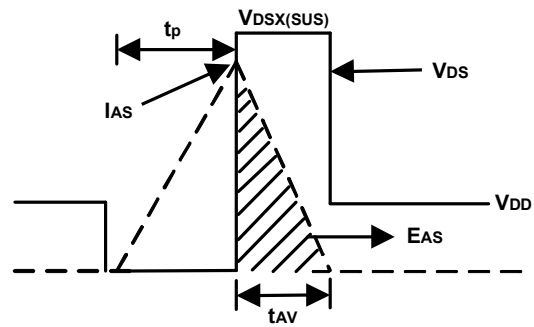
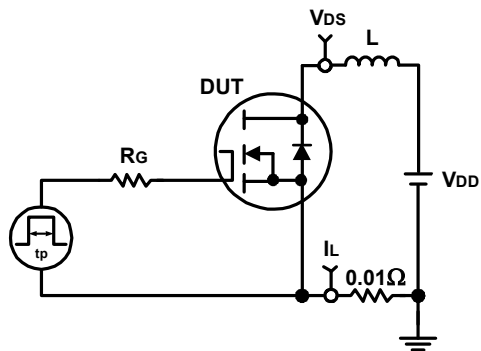
## Typical Operating Characteristics (Cont.)



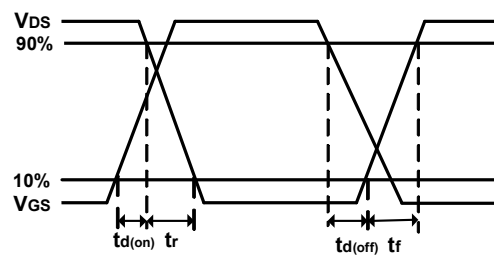
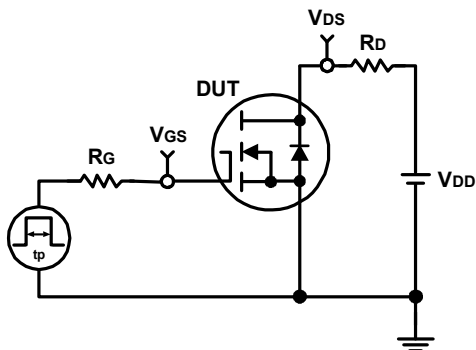
## Typical Operating Characteristics (Cont.)

**Drain-Source On Resistance**

**Source-Drain Diode Forward**

**Capacitance**

**Gate Charge**


## Avalanche Test Circuit and Waveforms

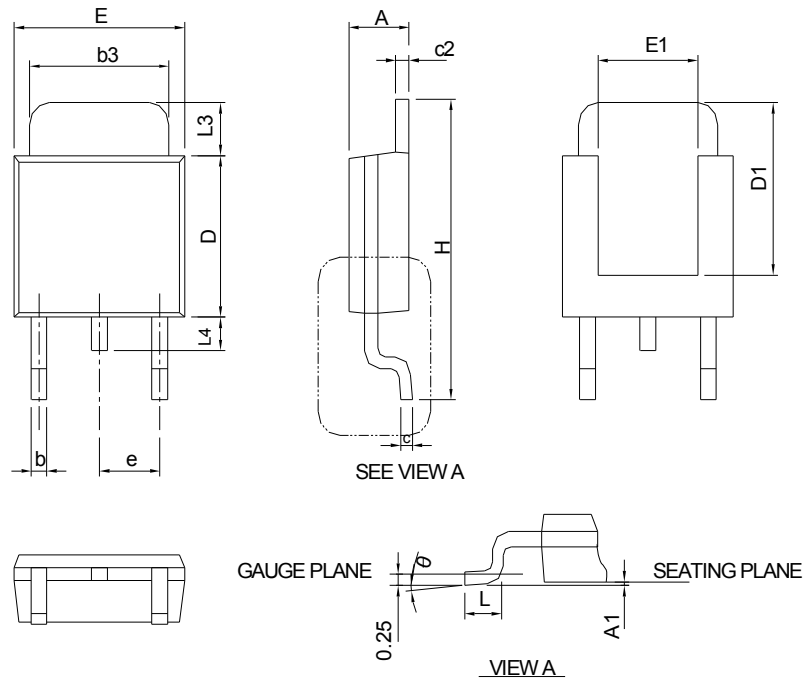


## Switching Time Test Circuit and Waveforms



## Package Information

TO-252-2



| SYMBOL | TO-252-2    |       |           |       |
|--------|-------------|-------|-----------|-------|
|        | MILLIMETERS |       | INCHES    |       |
|        | MIN.        | MAX.  | MIN.      | MAX.  |
| A      | 2.18        | 2.39  | 0.086     | 0.094 |
| A1     | -           | 0.13  | -         | 0.005 |
| b      | 0.50        | 0.89  | 0.020     | 0.035 |
| b3     | 4.95        | 5.46  | 0.195     | 0.215 |
| c      | 0.46        | 0.61  | 0.018     | 0.024 |
| c2     | 0.46        | 0.89  | 0.018     | 0.035 |
| D      | 5.33        | 6.22  | 0.210     | 0.245 |
| D1     | 4.57        | 6.00  | 0.180     | 0.236 |
| E      | 6.35        | 6.73  | 0.250     | 0.265 |
| E1     | 3.81        | 6.00  | 0.150     | 0.236 |
| e      | 2.29 BSC    |       | 0.090 BSC |       |
| H      | 9.40        | 10.41 | 0.370     | 0.410 |
| L      | 0.90        | 1.78  | 0.035     | 0.070 |
| L3     | 0.89        | 2.03  | 0.035     | 0.080 |
| L4     | -           | 1.02  | -         | 0.040 |
| θ      | 0°          | 8°    | 0°        | 8°    |

Note : Follow JEDEC TO-252 - 2 .

### RECOMMENDED LAND PATTERN

